

[22750/493]

## A SHOE, IN PARTICULAR A SHOE FOR SMALL CHILDREN

## Background of the Invention

The present invention relates to a shoe, in particular a shoe for small children, which supports the development of the foot in a natural way and, especially as a shoe when learning to walk, promotes the first steps of a small child.

## Related Art

Already in German Patent C 10 70 962, it was established that the rotational mobility of the heel part of the sole with respect to the forward part of the sole, in the sense of a wringing, is essential for an undisturbed sequence of development of the foot. In addition, in that publication it is described as known that the insole and/or the outsole of the footwear are provided in the area of the articulated point with cutouts that proceed from the edges of the sole and that are filled by inserts, which are made of a more pliant material than that of the in- or outsole. In the area of the articulated point the width of the sole, which is furnished with the inserts, corresponds roughly to the dimensions that are established by the vertical projection of the foot, so that the foot is protected by the base of the shoe. The overall depth of these cutouts can be smaller than the overall width of the sole in the area of the articulation, the cutouts being wider in the area of the edge of the sole than in the area of the interior of the sole. In place of a single cutout, it is also possible to assign to each edge of the sole a plurality of cutouts running roughly transverse to the longitudinal direction of the sole, whose edges, bordering a cutout, essentially run parallel to each other and whose width corresponds at least to the thickness of the sole.

On the upper side of the sole is arranged a molded footbed

support, which can be bonded in one piece to the material of the inserts that fill out the cutouts. The cutouts here are situated mainly on the outer edge of the foot, so that the sole of the forward area of the foot is connected via a roughly centered crosspiece to the outsole of the rear area of the foot.

From German Patent U 87 14 923, it is known to use anatomically shaped shoe soles, which are anatomically formed in a natural way in accordance with the imprint of a healthy foot and which can be used for all shoes. It can be seen from the drawing that the sole in the area of the transition between the heel and the forefoot is not shaped in accordance with the outline of the foot, but rather in accordance with its contact surface. Therefore, in this area, there is a reduction in the width. The problem of rotational mobility is not described.

From German Patent C 43 16 237, it is also known to provide a reinforcing element made of a fibrous material, which is configured as a supporting plate and which also traces the foot contact surface in the area of the outer edge of the foot.

Despite the measures proposed here, there remains a need for improvement in promoting unhindered physiological movement of the foot in all motions.

#### Presentation of the Invention

According to the present invention, the outsole in the area of the contraction has a connecting piece having a degree of flexibility such that a torsion of the front of the foot with regard to the back of the foot is impeded as little as possible, and high flexibility in the area of the front of the foot is provided to the outsole regarding the motion of the foot, as a result of an appropriate profiling.

As a result of the combination of an increased rotational mobility in the heel part of the sole with respect to the forward part of the sole, together with a zone of high flexibility in the ball of the foot area of the front of the foot, the physiological heel to toe of the foot is promoted in all motions. In contrast to the related art, in which the flexibility is determined by the material selected and by the thickness of the sole, the flexibility of the sole is primarily achieved through the geometric configuration of the sole.

In this context, the contraction can be configured such that the area of the outsole in the front of the foot is connected via a crosspiece to the area of the outsole in the back of the foot. As a result, a single-piece injection-molding of the sole is possible.

The shoe is particularly suitable as a shoe for small children, because it supports the first steps of the small child while making possible the natural play of the toes, as a result of which the foot can move in a natural manner.

Advantageously, the profiling is executed in the form of parallel or ray-shaped grooves, which extend at least partially over the width of the shoe. The extension over the entire width of the shoe is particularly advantageous, the profiling being able to be made of a plurality of materials of differing elasticities. As a result, it is possible to increase the flexibility overall while maintaining the necessary minimum thickness for manufacturing the sole and for achieving a sufficient stability of the sole.

It is advantageous to arrange the contraction of the outsole on the interior side of the shoe, because the movement of the foot in rolling from heel to toe is particularly pronounced in this area.

The contraction can be extended into the area of the back of the foot, so that if a shoe heel is present, it is even partially chamfered. Greater flexibility is achieved as a result.

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For improving the flexibility, the thickness of the outsole is advantageously reduced to the thickness required for manufacturing. In order to give the foot sufficient support despite the elastic sole, in addition to an anatomically shaped footbed, a heelplate or a flexible heel brace is provided for a heel guide, which is advantageously configured so that the Achilles tendon is free.

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To improve the position of the foot, it is advantageous if the outsole in the area in the back of the foot has a heel. This heel extends under the heel bone of the child's foot in the direction of the forefoot and can be narrowed in the area of the interior of the foot as a result of the contraction.

#### Brief Description of the Drawing

In the drawing, a children's shoe according to the present invention is depicted. The following are the contents:

- 25 Figure 1 depicts a children's shoe according to the present invention in a view from below,  
Figure 2 depicts the children's shoe from Figure 1 in a side view emphasizing a reinforced heel area,  
Figure 3 depicts a further children's shoe according to the present invention in a view from below, and  
30 Figure 4 depicts an enlargement of the sole of the children's shoe from Figure 3 in a side view.

#### Execution of the Invention

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Figure 1 depicts the lower side of a outsole 1. Outsole 1 is subdivided into an area in the forefoot 2 and an area in the

back of the foot 3, which are connected to each other by a connecting area 4. Connecting area 4 arises as a result of a contraction 5 on interior side 6 of foot 7, whose contour is indicated by dotted line. Also running along this dotted-line contour is the undepicted upper part, that extends underneath the foot, so that in the area of contraction 5 the upper part is without any covering from below by sole 1.

In area 3 in the back of the foot, a heel 8 is arranged, which is partially cut out in the area of contraction 5. Heel 8 offers protection against slipping in climbing or going up stairs. In area 2 in the forefoot, a profiling 9 is provided, which extends from presupposed position 10 of the ball of the foot on interior side 6 of the foot to the exterior side of the foot.

Due to contraction 5, connecting area 4 is configured in a reduced width with respect to the projection surface of the foot, and in the depicted exemplary embodiment it is narrowed only on interior side 6 of the foot. However, it is advantageous to provide an appropriate contraction also on the exterior side of the foot. In this way, a connecting piece between the area of the forefoot and the area of the back of the foot arises.

In order to assure the foot sufficient support in the shoe despite the very flexible outsole, a heelplate or stiffener 21 is provided, which is depicted in Figure 2 and which is arranged in an upper part 22, the heelplate extending downwards in the area of the Achilles tendon, so that the Achilles tendon is free, the heelplate nevertheless being pulled up in the area of the front of the heel bone and extending beyond heel 8 to the exterior edge of the foot. Alternatively, a heel brace arranged on the exterior can also be used to generate an improved connection of the shoe to the foot in the heel area.

The children's shoe depicted in Figure 3, in the area of the toe joint, i.e., at the transition between the middle of the foot and the toes, has a profiling 9, extending over the entire width, in the form of crosspieces 9.1-9.4 and grooves 10.1-10.5. Taken together with contraction 5, a shoe of great flexibility is achieved in this manner, which little hinders the torsion of the foot and otherwise favors the motion of the foot in the area of the forefoot.

In Figure 4, an enlargement of the sole of the children's shoe from Figure 3 is depicted in a side view of the exterior side of the shoe. Profiling 9 can be seen in the form of crosspieces 9.1-9.4 and grooves 10.1-10.5, which can be filled at least partially by a second material. This embodiment has less bending resistance and therefore contributes to the plasticity while at the same time assuring a sufficient thickness of the sole for protecting the foot.

Crosspieces 9.1-9.4 widen in the direction of the exterior edge of the shoe, so that, over the width of the shoe, in response to the motion of the foot, the exterior edge of the shoe has less bending resistance in the sole than the interior edge of the shoe.

Beginning from heel 8, the thickness of the sole decreases not only as a result of the contraction, which is not visible in this representation, but also as a result of the reduction in the thickness of the sole in area 11.

It is furthermore essential for comprehending the present invention, that the upper part of the shoe in the area of contraction 5 on the lower side of the shoe remains free, i.e., not covered by the sole. In the area of the exterior side of the foot, it is possible to configure the contraction as an arch that is covered only by a thin layer of sole material.